CIRCUIT DESCRIPTION

CD-3C290-01
ISSUE 1
APPENDIX 3B
DWG ISSUE 4B
DISTN CODE 1N42

7

COMMON SYSTEMS
48 CHANNEL PCM BANK TYPE D4
MAINTENANCE BANK
APPLICATION SCHEMATIC

CHANGES

D. Description of Changes

D.1 Five wires were added to the backplane wiring to improve the method of testing the D4 units and to accommodate the testing of new D4 units.

D.2 Sheet A1 of SD-3C290-01 was updated to show the sheets that were changed.

D.3 In FS 1B, FS 3B and in Fig. 5, option A was added.

D.4 Circuit Notes 103 and 104 were changed to indicate the use of option A.

D.5 Equipment Note 207 was added to clarify the D5 wiring.

D.6 Sheet D2 was corrected to reflect the D2 wiring changes.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 4222-KDM/HHM-WGS

Printed in U.S.A.

CIRCUIT DESCRIPTION

CD-3C290-01
ISSUE 1
APPENDIX 2AC
DWG ISSUE 3AC
DISTN CODE 1N42

COMMON SYSTEMS
48 CHANNEL PCM BANK TYPE D4
MAINTENANCE BANK
APPLICATION SCHEMATIC

CHANGES

B. Changes in Apparatus

B.1 Added

FS1B, FS2B, FS3B, FS4B, FS6B, FS7B, FS8B, and FS9B
Option Y and Z

D. Description of Changes

D.1 Thirty-three wires were removed and seventy-two wires were added to the backplane wiring.

D.2 FS1, through FS9 were renumbered to: FS1A, FS2A, FS3A, FS4A, FS5A, FS6A, FS7A, FS8A, FS9A, respectively, and each is marked option X, (MD).

D.3 FS1 through FS9B were inserted in the appropriate places to reflect this change and are marked option Y and Z.

D.4 Circuit Note 101 was changed to show a normal upper limit of voltage range of 54 volts and an emergency upper limit of 53.5 volts; Circuit Notes 103 and 104 were updated to indicate the use of option X and options Y and Z.

D.5 Circuit Notes 108 and 109 were added to explain the mode and option, respectively, and as a caution.

D.6 Equipment Note 203 was revised.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 4222-KDM/HHM-WGS

CIRCUIT DESCRIPTION

CD-3C290-01
ISSUE 1
APPENDIX 1A
DWG ISSUE 2A
DISTN CODE 1N42

5

COMMON SYSTEMS
48 CHANNEL PCM BANK TYPE D4
MAINTENANCE BANK
APPLICATION SCHEMATIC

CHANGES

D. Description of Changes

D.1 This is a preproduction change to bring the drawing into agreement with manufacturing information and to make drafting corrections.

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DEPT 4222-REB-WGS

CD-3C290-01
ISSUE 1
DWG ISSUE 1
DISTN CODE 1N42

COMMON SYSTEMS
48 CHANNEL PCM BANK TYPE D4
MAINTENANCE BANK
APPLICATION SCHEMATIC

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SECTION I - GENERAL DESCRIPTION

1. PURPOSE OF CIRCUIT

1.01 The D4 maintenance bank (D4MB) is a test and maintenance facility for use in offices where D4 channel banks are installed. It contains a maintenance bank test set (MBTS) and two complete digroups of D4 common equipment. The MBTS is used for testing the more commonly used D4 channel units and for monitoring the performance of the D4 common equipment. The common equipment plug-ins are used as "safe operable" units for restoring service to a failed D4 bank as well as for supplying the appropriate pulse code modulation (PCM) and control signals to the MBTS.

1.02 The D4MB is made up of two shelves of plug-in equipment. Three plug-ins in the upper shelf contain the circuits for testing channel units, monitoring common equipment, and alarming the D4MB. The upper shelf also contains the channel unit under test (CUT) position, a storage and test location for a signaling path test set, and a maintenance (MTCE) drawer for tools and instructions. The lower shelf contains the D4 common equipment and a 4E&M channel unit. This channel unit is used during the monitoring function to gain voice frequency (VF) access to digroup B.

2. GENERAL DESCRIPTION OF OPERATION

2.01 The MBTS consists of three plug-in units, the 1A, the 1B, and the maintenance bank alarm (MB ALM) (see FS 5). These units contain the circuits for testing channel units and monitoring the performance of the common equipment.

2.02 All access to the CUT is made at the printed board connector in order to include all channel unit circuitry in the tests. The 1A and 1B plug-ins perform the following tests on the channel unit.

(a) Transmission level of channel unit transmitter at 1020 Hz.

(b) Transmission level of channel unit receiver at 1020 Hz.

(c) Steady state signaling capability of transmitter and receiver.

(d) Multichannel (MC) interference to and from other channel unit time slots.

(e) 20-Hz ringing.

(f) Trunk processing relays.

2.03 The MBTS contains built-in self-testing circuits. If a channel unit should fail a transmission test, a calibrate (CAL) test will verify that the error in signal level is in the CUT and not in the test set or common equipment. Similarly, failing the MC interference test, an MC calibrate (MC CAL) test will verify that the interference is in the CUT and not in the test set or common equipment.

2.04 When the D4MB is not being used to test channel units, it can continuously monitor the level of a 1020 Hz test tone which is transmitted through both digroups of D4 common equipment (see BD 1). The tone is first transmitted through digroup A via a channel unit simulator circuit (CU

SIM) and then through digroup B via the 4E&M channel unit. The tone out of the 4E&M is monitored and an alarm signal is generated if the level is in error by more than ±0.5 dB.

2.05 The MB ALM unit provides one office minor alarm audible and one visual closure. The alarm can be triggered by either the D4 common equipment located in the D4MB or by the MBTS when it is used for the monitoring function.

2.06 The D4 common equipment portion of the D4MB can be equipped for any one of the four different modes of operation, depending upon the needs of the telephone office (see BD 1).

SECTION II - DETAILED DESCRIPTION

1. 1A MAINTENANCE BANK TEST SET

1.01 The faceplate of the 1A MBTS contains six light-emitting diodes (LEDs) (see SD-3C291-01) that indicate whether the CUT passed or failed the transmission tests. These LEDs are labelled as follows.

A. Under VF:

(a) MON - The LED is illuminated (green) when the monitored test tone level is acceptable and dark when the level is outside this range.

~~(b) CAL - The LED is illuminated (green)~~ when the voice frequency (VF) portion of the MBTS is within normal limits.

(c) TRMT - The LED is green when the VF circuits in the transmit portion of the CUT are satisfactory.

(d) RCV - The LED is green when the VF circuits in the receive portion of the CUT are satisfactory.

B. Under MC:

(e) PASS - The LED is illuminated (green) when the multichannel interference level is not excessive.

(f) FAIL - The LED is illuminated (red) when the multichannel interference level is excessive.

1.02 The faceplate also contains the following (see SD-3C291-01).

(a) Transmit Attenuator (TRMT ATTEN) and Receive Attenuator (RCV ATTEN) switches - The setting of these attenuators is dependent upon the condition of the attenuators in the channel unit to be tested.

(b) Switches 18 and 19 which condition the MBTS for the proper impedance for for 2-wire or 4-wire operation.

(c) Test jack (TST A) which aids in trouble location in the MBTS when used with a D3/D4 portable test set.

1.03 The 1A MBTS contains an oscillator which provides a stable 1020-Hz sine wave for use in transmission level checking and multichannel interference measurements. It also contains transmit and receive attenuators, together with a level detector and an interference (MC) detector. Transmisstion tests on a channel unit are made separately on the transmit and receive portion in order to localize troubles.

2. 1B MAINTENANCE BANK TEST SET

2.01 The faceplate of the 1B MBTS contains eleven LEDs that indicate signaling conditions on the CUT. Also located on the 1B faceplate are switches 1 through 17 that control the signaling, as well as the transmission tests. Test jacks are also provided as an additional aid in locating trouble.

2.02 The 1B MBTS contains a "channel unit simulator" which is similar in many ways to a standard D4 channel unit and permits the 1A and 1B MBTS to apply test tones and steady state signaling conditions directly to the common equipment. The simulator occupies the channel 1 time slot of digroup A, and the CUT occupies the channel 13 time slot so that, by use of the R-SHIFT feature in the common equipment, either the transmit or receive portion of the CUT can be tested individually. The change to R-SHIFT is controlled automatically by the switches on the 1B MBTS.

2.03 The 1B MBTS also contains all circuitry for applying and detecting steady state signaling conditions to the CUT. These circuits perform tests on both the line and drop side of the transmit and receive portions of the channel unit.

2.04 The channel unit tests are performed by operating pushbuttons on the 1A and 1B MBTS in sequence. The test sequence and corresponding LED indications for each type of channel unit are listed on instruction cards stored in the MTCE drawer.

3. MAINTENANCE BANK ALARM

3.01 The maintenance bank alarm unit will initiate an office minor alarm if the monitored signal level is outside normal limits or if the D4 common equipment summary alarm on the power distribution unit (PDU) operates. An alarm disable (ALM DISAB) switch on the face of the MB ALM will disable the office alarm when the maintenance bank is used for testing plug-ins.

3.02 The MB ALM unit is designed to operate only with a fully equipped D4MB. The unit will register a permanent alarm condition if either the 1A, 1B, or a D4 plug-in is removed.*

*One exception is that the D4 OIU can be removed without operating the alarm.

4. SIGNALING PATH TEST SET

4.01 The signaling path test set is used in a channel unit position to test transmission and signaling of a D4 bank. It can be used in a single-ended, normal-looped arrangement or in an R-SHIFT arrangement. It can also be used end-to-end if desired. In its storage position in the D4MB, it is assigned the channel 13 time slot in digroup B.

5. D4 CHANNEL UNITS AND COMMON EQUIPMENT

5.01 The circuit descriptions of the remaining D4 plug-in units in the D4MB are covered in CD-3C304-01.

SECTION III - REFERENCE DATA

1. WORKING LIMITS

1.01 None.

2. FUNCTIONAL DESIGNATIONS

2.01 None.

3. FUNCTIONS

3.01 Provides a means for testing the transmission and signaling functions of D4 channel units.

3.02 Provides for the monitoring of a test tone that is transmitted through both digroups of D4 common equipment.

3.03 Provides two digroups of powered and monitored D4 common equipment that can be used to restore service to a failed D4 bank.

3.04 Provides PCM and control signals for the MBTS.

3.05 Provides for self testing of the MBTS.

3.06 Provides an office minor alarm if a failure develops in the D4MB.

4. CONNECTING CIRCUITS

4.01 Maintenance Bank Test Set - SD-3C291-01

4.02 Signaling Path Test Set - SD-3C294-01

4.03 48 Channel PCM Bank Type D4 - D4 Voltage Indicator and Power Simulator Circuits - SD-3C295-01

4.04 Extenders - SD-3C296-01

4.05 48 Channel PCM Bank Type D4 Line Interface Unit-1 - SD-3C300-01

4.06 48 Channel PCM Bank Type D4 Line Interface Unit-2 - SD-3C301-01

4.07 48 Channel PCM Bank Type D4 Line Interface Unit-3 - SD-3C302-01

4.08 48 Channel PCM Bank Type D4 Syndes Unit - SD-3C303-01

4.09 48 Channel PCM Bank Type D4 Transmit Unit - SD-3C305-01

4.10 48 Channel PCM System Type D4 Receive Circuit - SD-3C306-01

4.11 48 Channel PCM Bank Type D4 Alarm Control Unit - SD-3C307-01

4.12 48 Channel PCM Bank Type D4 Office Interface Unit-1 - SD-3C308-01

4.13 48 Channel PCM Bank Type D4 Trunk Processing Unit - SD-3C311-01

4.14 48 Channel PCM Bank Type D4 Power Distribution Unit - SD-3C312-01

4.15 48 Channel PCM Bank Type D4 DS2 Line Interface Unit-4T (or 4R) - SD-3C313-01 and SD-3C314-01

4.16 48 Channel PCM Bank Type D4 Dial Pulse Channel Unit Circuit Originating Office End - SD-3C322-01

4.17 48 Channel PCM Bank Type D4 Dial Pulse Channel Unit Circuit Terminating Office End - SD-3C323-01

4.18 48 Channel PCM Bank Type D4 4-Wire E&M Channel Unit - SD-3C324-01

4.19 48 Channel PCM Bank Type D4 Channel Unit Circuit Foreign Exchange Station End - SD-3C325-01

4.20 48 Channel PCM Bank Type D4 Channel Unit Foreign Exchange Office End - SD-3C326-01

4.21 48 Channel PCM Bank Type D4 2-Wire E&M Channel Unit Circuit - SD-3C327-01

4.22 48 Channel PCM BAnk Type D4 Channel Unit Sleeve Dial Pulse Originating - SD-3C330-01

4.23 Power Systems DC Distribution Circuit for Digital Transmission System - SD-82046-01

4.24 Power Converter Unit - SD-82371-01

5. MANUFACTURING TESTING REQUIREMENTS

5.01 The manufacturing testing requirements are specified in X-79095.

BELL TELEPHONE LABORATORIES, INCORPORATED

DEPT 4222-REB-WGS
JSR

CIRCUIT DESCRIPTION

CD-26026-01
ISSUE 8D
APPENDIX 4B
DWG ISSUE 24B
DISTN CODE 1C02

CROSSBAR SYSTEMS
NO. 5
INCOMING REGISTER MARKER
CONNECTOR CIRCUIT
REGISTER PART
FOR DP, MF, RP, AND FSP INCOMING REGISTERS
AND CAMA SENDERS

8

CHANGES

D. Description of Changes

D.1 A modification is made to provide an additional option ZH for the THT2 and THT3 leads to accommodate operation with independent features in incoming registers and CAMA senders. Option ZG presently provides these leads through the IRMC-RP to both incoming registers and CAMA senders. As a result, where these leads are required by incoming registers arranged for more than 2000 trunk numbers or tandem switching applications, and CAMA senders are not arranged for flexible storage of the trunk number (do not require connection to these leads), no terminating points for these leads are provided on the CAMA sender frame. In the revised arrangement, new option ZH, rated after-date Standard, provides for connection of the THT2 and THT3 leads to the CAMA senders, and option ZG, to incoming registers, only where equipped with the corresponding feature above.

D.2 The LT3 lead, option ZD is rerated from Mfr Disc. to after-date Standard for application in offices where the PLN digit 8 access code indication is required from the incoming register.

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